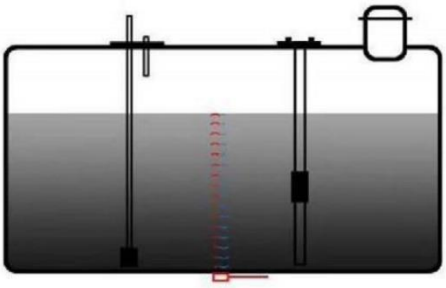
KUM2500C Ultrasonic Fuel Level Sensor

Introduction

KUM2500C ultrasonic fuel level sensor is a fuel quantity monitoring device designed for fleet managers of enterprises. It can be used to prevent drivers from stealing fuel, optimize operating costs, optimize driver driving behavior, and assist statistical decision-making. The sensor uses an ultrasonic probe to detect the oil level, and then intelligently processes the oil level signal through the built-in program of the host. Finally, the oil level information is sent to the system platform through GPS, and an oil level report is generated after analysis. The sensor supports serial port and analog output, and can be connected with most brands of GPS/Beidou all-in-one computers, and the sensor can be easily connected to the background monitoring system.

KUM2500C adopts the non-contact measurement ultrasonic sensor technology independently developed by the company and pioneered in China. It is currently widely used in automobile fuel consumption monitoring projects and exported to overseas.



Features

1. High precision. The resolution of the oil level sensor oil level height measurement is 0.1mm, and the measurement accuracy is ±0.5%, which can ensure high measurement accuracy in the high temperature and high cold external environment;
2. Good long-term stability. The oil level sensor adopts the ultrasonic measurement method and implements non-contact measurement, which is different from the direct contact float type, pressure type, and magnetic sliding measurement method commonly used at present, so as to avoid the oil level sensor from being corroded and polluted by fuel. It can maintain the stability of long-term measurement;
3. Easy installation and maintenance. It is only necessary to install the sensor probe under the outside of the fuel tank, without changing the original fuel tank measurement system, without opening and changing the fuel tank, and ensuring the normal operation of the original automobile fuel gauge;
4. Environmental protection, no pollution, low energy consumption, non-contact measurement, no need to drill or modify the fuel tank to cause fuel dirt and pollution.
5. Strong reliability. It can also work normally in harsh environments, moisture-proof, acid-proof, flame-retardant, anti-interference, and intelligent.

The product can be used alone, use the auxiliary display screen to directly view the data, and can also be used in conjunction with the GPS device to transmit the data to the background through the GPS device for data statistics, report analysis and query.

Application

- Internet of vehicles solutions
- Industrial control - textile mills
- Rainwater monitoring
- Road water monitoring

Technical Parameter

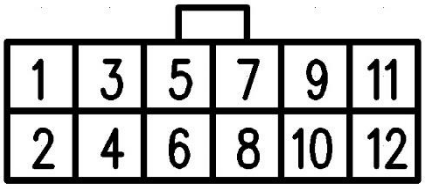
No.	Item	Introduction
1	Working Voltage	DC 9V~36V.
2	Working Temperature	-30℃~+80℃
3	Storage temperature	-40℃~+85℃.
4	Measure Range	3~100cm (2m can be customized).
5	Maximum power consumption	0.8W/12VDC
6	Measurement accuracy	±0.5%FS
7	Measurement resolution	0.1mm
8	Inbreaking Protection	IP67
9	Peripheral interface	RS232 / RS485 / 0-5V / 4-20mA
10	Tank Materials	conventional fuel tanks such as aluminium alloy/iron/plastic
11	Communication port parameter	default baud rate is 9600 (the baud rate can be configured), no parity bit, 8 data bits, 1 stop bit, and no flow control.

Note: About the measurement range:

- For 5mm thick Q235 type steel plate, with No. 0 diesel, the measuring range is 3~100cm
- The rest is based on the actual height measured, depending on the material and thickness of the container.

Wiring

Pin Definition



Pin	Function	Description
1	Power +	9~36VDC
2	Power -	
3	TX	RS232 sender
4	RX	RS232 receiver
5	B	RS232 sender RS485 B

6	A	RS232 receiver RS485 A
7	NC	Reserved
8	NC	Reserved
9	AOUT	Analog voltage output
10	GND	Reference GND
11	NC	Reserved
12	NC	Reserved

LED Definition

Steady green light: The probe is working normally
Steady red light: the probe is abnormal (probe cable is not plugged in, or the probe falls off)

Wire Definition

Colour	Function	Description
Red	Positive pole of power supply	9~36VDC
Black	Negative pole of power supply	
Yellow	TXD	RS232: transmitting terminal of the device
Blue	RXD	RS232: receiving terminal of the device
Brown	B	+V
Purple	A	+OUT
Green	AOUT	Analog voltage output
Black	GND	

Installation

1. Preparation

1. Standard configuration: sensor host (1), probe (1), extension cable (1), user interface cable (1), couplant (1 box), 1.2m hose clamp (3), sandpaper (2);
2, glue;
3. Customers need to bring their own: 12V mobile power supply, insulating tape, rags, paper towels (for wiping off oil stains).

Note: Before loading, please give the vehicle at least half a tank of fuel. (It is best to install in this state)

2. Confirmation of actual fuel quantity and installation environment

1. Oil level prediction: judge the approximate oil level of the fuel tank by checking the fuel gauge of the car, knocking the fuel tank, or opening the fuel tank cover with the help of a long thin wire, and record it (for example, the prediction is about 300mm);

2. Before loading, please make sure that the vehicle is parked on a level ground and the fuel tank is placed horizontally on the frame (with the help of a spirit level).

3. Find the installation area

1. The installation area of the probe should avoid the oil filling port, oil outlet, oil return pipeline, oil float, baffle, etc., and try to choose a position where the bottom of the oil tank is relatively flat and as close to the central area as possible; (see the following figure for the internal structure of the oil tank)
2. In addition to avoiding obstacles, the circular fuel tank should also choose the cut surface closest to the ground.

4. **Confirm the installation position**

1. Connect the sensor host to the user interface cable, extension cable, and probe, and supply power. At this time, the liquid level is displayed as 000.0;
2. Clean up the selected installation area of the fuel tank;
3. Apply couplant on the surface of the probe, and press the probe to the selected installation position; you can see the current measured liquid level displayed on the display screen of the host (as shown in the figure below)

4. Press and hold the "button 1" in the picture for more than 6 seconds and release it to enter the total height of the fuel tank. F060 in the picture below indicates that the total height of the fuel tank is 60cm. Short press the "button 2" to increase, and short press the "button". 3" reduction. Press and hold "Button 1" for 6 seconds to confirm this parameter.

5. After the total height of the fuel tank is input, press and hold the "button 1" for more than 6 seconds to release it, and then enter the current level input state of the fuel tank. E030 in the figure below indicates that the current level of the fuel tank is about 30cm, and short press the "button 2". Increase, short press "button 3" to decrease.

6. After the current liquid level of the fuel tank is input, press and hold the "button 1" for more than 6 seconds to enter the automatic adjustment state of the signal strength of the fuel tank. At this time, you can check whether the height displayed on the display is roughly the same as the actual fuel level height, (for example, it is predicted to be 300mm Left and right, display 285.2mm) If the display screen shows 000.0 or the displayed height is too different from the actual height, you can move the probe slightly or polish the tank wall more, and the buzzer in the device will sound continuously and long at this time (if the buzzer beeps) If the buzzer sounds intermittently or not, then you need to continue to find the installation point or polish the fuel tank wall more until the buzzer sounds continuously), then you can long press the "button 1" in the picture on the right for more than 6 seconds Complete mount point discovery and testing.

5. Fix the probe

1. If there is paint on the part where the probe is pasted at the bottom of the fuel tank, sandpaper should be used to polish the paint on the pasted part, and wipe off the oil and water to keep the surface dry and clean;
2. Use glue to paste: After cleaning the probe surface couplant, squeeze out a grid of component A and component B respectively, and drop them into the center of the probe, stir quickly and evenly, the higher the temperature, the faster the curing speed. If the temperature is lower than 8 degrees, it is necessary to preheat the surface of the probe before dripping glue. Align the probe line towards the frame of the vehicle, stick the probe to the installation position, and confirm that the displayed height and the actual liquid level are correct and stable (if it is not correct, remove the probe immediately, dry the glue on the bottom of the fuel tank and the probe, Re-select another position next to the paste until you find the correct and stable paste position), continue to press the probe for more than 8 minutes to make the glue initially solidify; use a long cable tie to bind and fix the probe with moderate tightness.
3. After fixing the probe, please confirm whether the height of the lower display is consistent with the actual remaining oil level.

Above is the standard mode, and it is also the recommended installation mode. If the installer finds it troublesome, he can directly check the installation position by looking at the indicator light on the display screen. If the liquid level displayed on the screen is consistent with the actual oil level, the indicator light on the display screen will turn green (as shown in the figure below), indicating the installation position. Basically, it can be installed, and the probe can be directly fixed. This method is relatively simple, but if the environment is poor, it may affect the stability of the data, so it is generally not recommended.

6. Cable Layout

1. Arrange the extension cable in the cab, and the wiring should be routed along the vehicle girder; and it will not affect the original functions of the original vehicle dump bucket, front inspection, etc.;
2. The extension cable needs to be far away from the motor of the vehicle to avoid electromagnetic interference generated by the motor;
3. The probe wire and the extension wire terminal are wrapped with insulating tape to prevent falling off;
4. There should be at least 20 cm distance between the extension cord and the heated part of the vehicle. The extension cable is fixed with cable ties every 50cm. Arrange the line reasonably to the installation position of the vehicle

7. Connect the vehicle and confirm the platform data

1. Power off, fix the host at a position close to the GPS (where there will be no water leakage), and fix it well;
2. The red and black lines of the user interface line are connected to the public power supply of the vehicle, the red is connected to the positive, and the black is connected to the negative;

Select the interface method according to the GPS fuel consumption interface:

A. Analog quantity: the green wire is connected to the GPS acquisition analog quantity port, and the black wire is connected to the GPS acquisition analog quantity ground;

B. RS232 communication: the yellow wire (TX) is connected to the RX of the GPS, the blue wire (RX) is connected to the TX of the GPS, and the black wire (GND) is connected to the ground of the GPS;

C. RS485 communication: the brown wire (B) is connected to GPS B, the purple wire (A) is connected to GPS A, and the black wire (GND) is connected to GPS ground;

3. Power on and check whether the platform has fuel consumption data.